2 x 6 watt stereo car radio power amplifier

TDA1517

FEATURES

- Requires very few external components
- High output power
- Fixed gain
- Good ripple rejection
- Mute/standby switch
- Load dump protection
- AC and DC short-circuit safe to ground and V_P
- Thermally protected
- Reverse polarity safe
- Capability to handle high energy on outputs (V_P = 0 V)
- No switch-on/switch-off plop
- Electrostatic discharge protection
- Compatible with TDA1519 (except gain).

GENERAL DESCRIPTION

The TDA1517 is an integrated class-B dual output amplifier in a plastic single in-line medium power package with fin; 9 leads (SIL9MPF) and a plastic heat-dissipating dual in-line package (HDIP18). The device is primarily developed for car radio and multi-media applications.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage					
	operating		6.0	14.4	18.0	V
	non-operating		–	–	30.0	V
	load dump protected		–	–	45.0	V
I_{ORM}	repetitive peak output current		–	–	2.5	A
$I_{q(tot)}$	total quiescent current		–	40	80	mA
I_{sb}	standby current		–	0.1	100	μA
I_{sw}	switch-on current		–	–	40	μA
$\|Z_I\|$	input impedance		50	–	–	kΩ
P_o	output power	R_L = 4 Ω; THD = 0.5%	–	5	–	W
		R_L = 4 Ω; THD = 10%	–	6	–	W
SVRR	supply voltage ripple rejection	f_i = 100 Hz to 100 kHz	48	–	–	dB
α_{cs}	channel separation		40	–	–	dB
G_v	closed loop voltage gain		19	20	21	dB
$V_{no(rms)}$	noise output voltage (RMS value)		–	50	–	μV
T_c	crystal temperature		–	–	150	°C

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA1517	SIL9MPF	plastic single in-line medium power package with fin; 9 leads	SOT110-1
TDA1517P	HDIP18	plastic heat-dissipating dual in-line; 18 leads	SOT398-1

BLOCK DIAGRAM

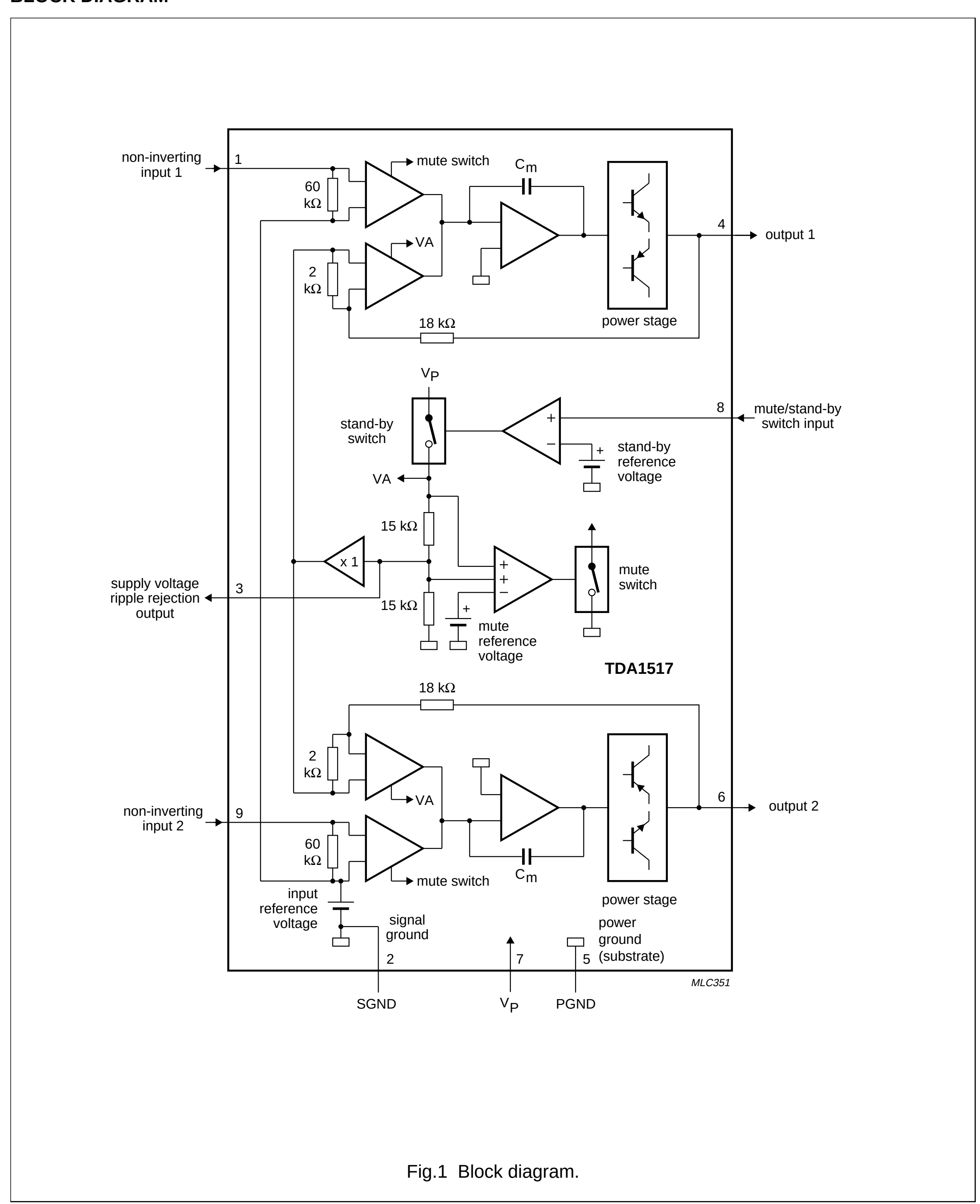


Fig.1 Block diagram.

PINNING

SYMBOL	PIN	DESCRIPTION
–INV1	1	non-inverting input 1
SGND	2	signal ground
SVRR	3	supply voltage ripple rejection output
OUT1	4	output 1
PGND	5	power ground
OUT2	6	output 2
V_P	7	supply voltage
M/SS	8	mute/standby switch input
–INV2	9	non-inverting input 2

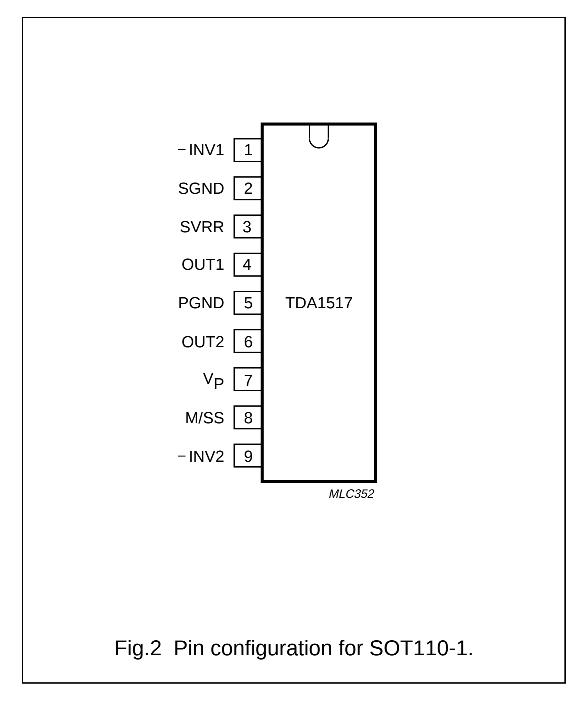
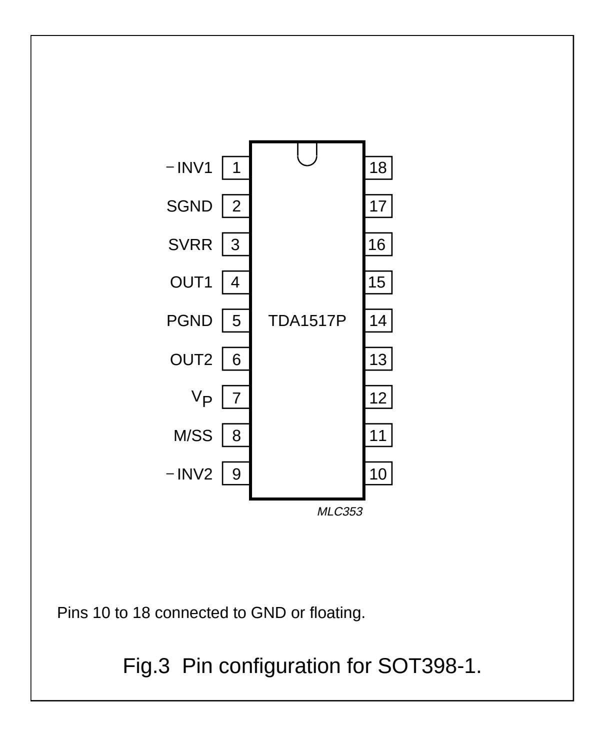


Fig.2 Pin configuration for SOT110-1.



Pins 10 to 18 connected to GND or floating.

Fig.3 Pin configuration for SOT398-1.

FUNCTIONAL DESCRIPTION

The TDA1517 contains two identical amplifiers with differential input stages. The gain of each amplifier is fixed at 20 dB. A special feature of the device is the mute/standby switch which has the following features:

- Low standby current (<100 μA)
- Low mute/standby switching current (low cost supply switch)
- Mute condition.

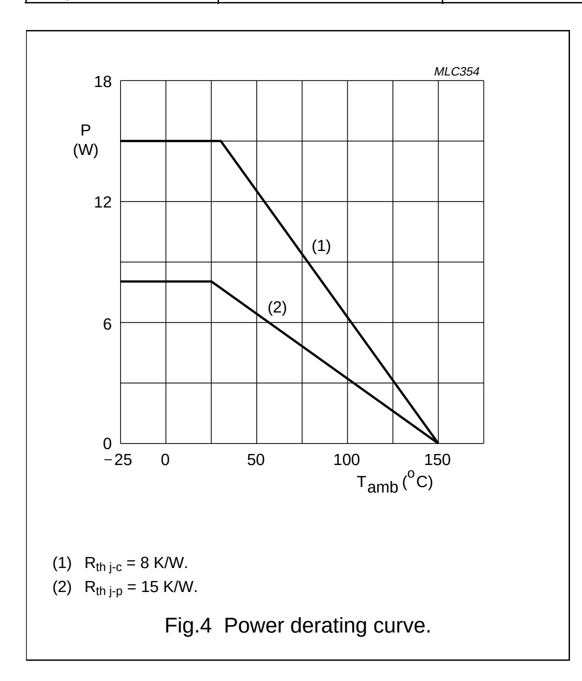
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_P	supply voltage				
	operating		–	18	V
	non-operating		–	30	V
	load dump protection	during 50 ms; $t_r \geq 2.5$ ms	–	45	V
$V_{P(sc)}$	AC and DC short-circuit safe voltage		–	18	V
$V_{P(r)}$	reverse polarity		–	6	V
ERG_O	energy handling capability at outputs	$V_P = 0$ V	–	200	mJ
I_{OSM}	non-repetitive peak output current		–	4	A
I_{ORM}	repetitive peak output current		–	2.5	A
P_{tot}	total power dissipation	see Fig.4	–	15	W
T_{stg}	storage temperature		–55	+150	°C
T_{amb}	operating ambient temperature		–	25	°C
T_c	crystal temperature		–	150	°C

THERMAL RESISTANCE

SYMBOL	TYPE NUMBER	PARAMETER	VALUE	UNIT
$R_{th\ j\text{-}c}$	TDA1517	thermal resistance from junction to case	8	K/W
$R_{th\ j\text{-}p}$	TDA1517P	thermal resistance from junction to pins	15	K/W
$R_{th\ j\text{-}a}$	TDA1517; TDA1517P	thermal resistance from junction to ambient	50	K/W



(1) $R_{th\ j\text{-}c} = 8$ K/W.
(2) $R_{th\ j\text{-}p} = 15$ K/W.

Fig.4 Power derating curve.

DC CHARACTERISTICS

V_P = 14.4 V; T_{amb} = 25 °C; measured in Fig.6; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply						
V_P	supply voltage	note 1	6.0	14.4	18.0	V
$I_{q(tot)}$	total quiescent current		–	40	80	mA
V_O	DC output voltage	note 2	–	6.95	–	V
Mute/standby switch						
V_8	switch-on voltage level	see Fig.5	8.5	–	–	V
Mute condition						
V_O	output signal in mute position	$V_{I(max)}$ = 1 V; f_i = 20 Hz to 15 kHz	–	–	2	mV
Standby condition						
I_{sb}	DC current in standby condition		–	–	100	μA
V_{sw}	switch-on current		–	12	40	μA

Notes

1. The circuit is DC adjusted at V_P = 6 to 18 V and AC operating at V_P = 8.5 to 18 V.
2. At 18 V < V_P < 30 V the DC output voltage ≤ ½V_P.

AC CHARACTERISTICS

V_P = 14.4 V; R_L = 4 Ω; f = 1 kHz; T_{amb} = 25 °C; measured in Fig.6; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
P_o	output power	THD = 0.5%; note 1	4	5	–	W
		THD = 10%; note 1	5.5	6.0	–	W
THD	total harmonic distortion	P_o = 1 W	–	0.1	–	%
f_{lr}	low frequency roll-off	at –3 dB; note 2	–	45	–	Hz
f_{hr}	high frequency roll-off	at –1 dB	20	–	–	kHz
G_v	closed loop voltage gain		19	20	21	dB
SVRR	supply voltage ripple rejection	note 3				
	on		48	–	–	dB
	mute		48	–	–	dB
	standby		80	–	–	dB
$\|Z_i\|$	input impedance		50	60	75	kΩ
V_{no}	noise output voltage					
	on	R_s = 0 Ω; note 4	–	50	–	μV
	on	R_s = 10 Ω; note 4	–	70	100	μV
	mute	note 5	–	50	–	μV
α_{cs}	channel separation	R_s = 10 Ω	40	–	–	dB
$\|\Delta G_v\|$	channel unbalance		–	0.1	1	dB

Notes

1. Output power is measured directly at the output pins of the IC.
2. Frequency response externally fixed.
3. Ripple rejection measured at the output with a source impedance of 0 Ω, maximum ripple amplitude of 2 V (p-p) and a frequency between 100 Hz and 10 kHz.
4. Noise voltage measured in a bandwidth of 20 Hz to 20 kHz.
5. Noise output voltage independent of R_s (V_I = 0 V).

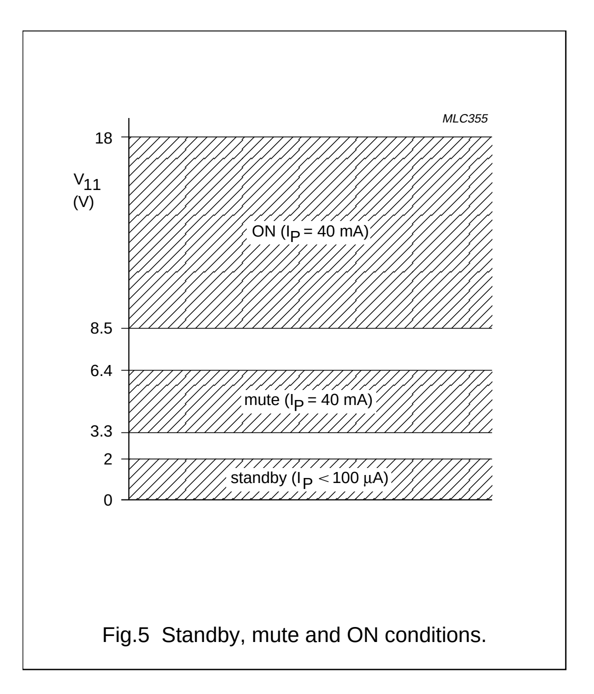


Fig.5 Standby, mute and ON conditions.

APPLICATION INFORMATION

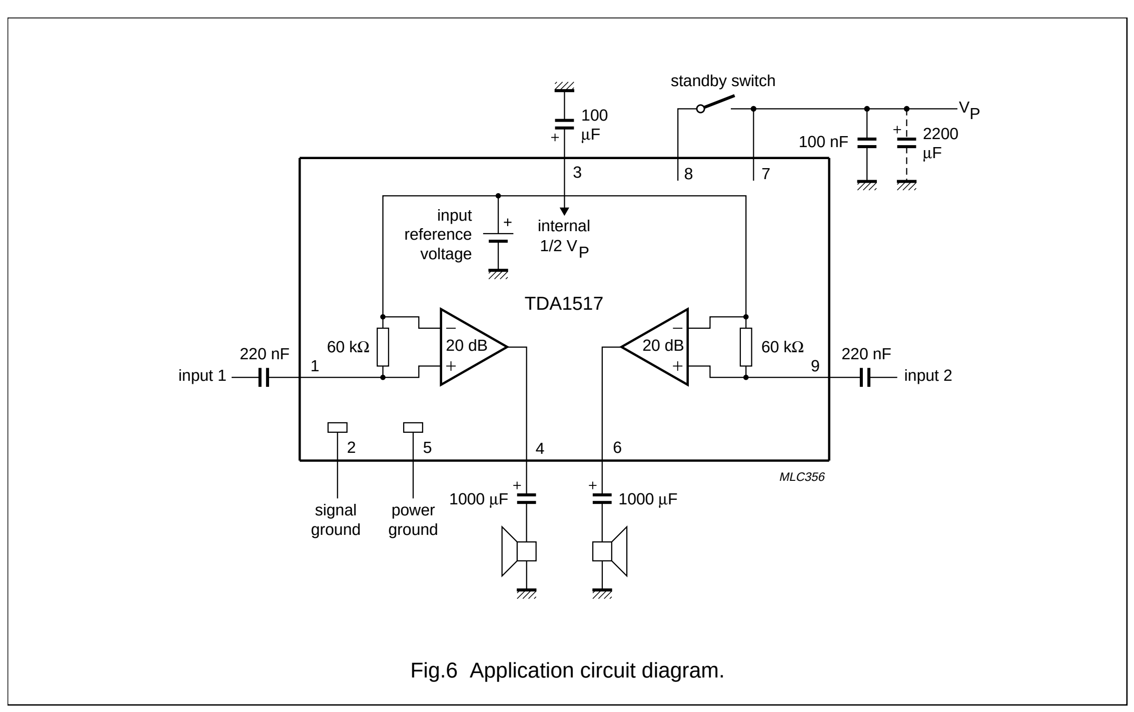


Fig.6 Application circuit diagram.